

# **The Role of Community Pharmacy in Post-Discharge Warfarin Management**

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## DECLARATION OF ORIGINALITY

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## STATEMENT OF ETHICAL CONDUCT

The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University.

All research procedures reported in the thesis were approved by the Tasmania Health and Medical Human Research Ethics Committee or the Tasmanian Social Sciences Human Research Ethics Committee.

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## ABSTRACT

Warfarin is the most widely prescribed oral anticoagulant worldwide and a major contributor to drug-related morbidity and mortality. Many of the clinical and healthcare system-related problems encountered during routine warfarin management are amplified in the period following a patient's discharge from hospital, further increasing the risk of adverse outcomes. Hospital-based post-discharge warfarin management services are limited in their capacity to manage all of the patients in need of care, and there is significant geographic variation in their availability. It has been demonstrated that pharmacists can successfully adopt a variety of roles in warfarin management; making greater use of their skills may contribute to reductions in the rates of warfarin-related adverse events in the post-discharge period.

A previous study conducted by Jackson *et al.* in southern Tasmania demonstrated the potential of a pharmacist-delivered, home-based post-discharge warfarin management service to improve the initiation of warfarin therapy and significantly decrease the rates of total bleeding, major bleeding and minor bleeding complications in the first three months post-discharge. Patient feedback was highly positive, and a cost-analysis estimated that widespread implementation of the service would lead to \$A5 million per annum in overall cost savings to the healthcare system. While this program was highly successful, it was believed that the intensity of the four-visit model may not prove sustainable for wide scale implementation.

The objective of this study was to develop and implement a sustainable pharmacist-delivered post-discharge warfarin management service to enable the smooth transition of both newly anticoagulated patients and those already taking warfarin from the hospital to community setting. Patients received either two or three home visits in their eight to ten days post-discharge, with point-of-care (POC) International Normalised Ratio (INR) monitoring and warfarin education integrated into the existing Australian government-funded Home Medicines Review (HMR) program in an attempt to assure its sustainability. The

service was investigated in a prospective, non-randomised controlled cohort study. Evaluation of the service included assessment of its clinical and educational outcomes, a formal economic analysis and a qualitative study of stakeholder satisfaction focussing strongly on the logistical aspects of service implementation and delivery.

Patients were recruited from eight hospital sites in five major centres across three Australian states. One hundred and thirty-nine patients received standard management by their general practitioner (GP) ('usual care') and 129 received the post-discharge service. The service was associated with statistically significant reductions in the rates of combined major and minor bleeding events (5.3% vs. 14.7%,  $p=0.03$ ) and combined bleeding and thromboembolic events (6.4% vs. 19.0%,  $p=0.008$ ) to Day 90 post-discharge. Persistence with therapy, based on the proportion of patients continuing warfarin at Day 90, improved from 83.6% to 95.4% ( $p=0.004$ ); an improvement in warfarin knowledge was also demonstrated. No significant differences in self-reported adherence, quality of life, hospital readmission and death rates or INR control were observed. The cost-analysis demonstrated that the costs to the healthcare system of providing the service were greatly exceeded by reductions in the costs of warfarin-related hospital admissions; the service was therefore shown to be highly cost-effective in regards to warfarin-related costs. An uncertainty analysis indicated that it was cost dominant in approximately 80% of the iterations of the model, and business cases suggested that it was a viable prospect from the perspectives of both the Australian government and the community pharmacy sector.

The qualitative study identified that the service was popular with patients and some elements, such as the warfarin education, were universally recognised as beneficial. Major barriers were perceived to the implementation of the service via the HMR program, however, especially with respect to the existing referral process. Issues were highlighted regarding GP and community pharmacy engagement with the service, and the need for improved information technology solutions was recognised to promote effective communication between

multidisciplinary care providers. Pharmacist workload and remuneration were also identified as potentially problematic. As a result of these issues, stakeholders considered the current service model largely unviable, promoting instead a range of alternative service models.

In conclusion, this study demonstrated undeniable deficiencies in current community-based post-discharge warfarin management practices and positive outcomes arising from the post-discharge service. It failed, however, to produce sufficient evidence to support its widespread implementation in its current form. The optimal method of delivering clinical pharmacy services in the community remains uncertain, and new paradigms may need to be explored as anticoagulation management practices continue to evolve into the future.

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# PUBLICATIONS

*All publications listed resulted from work described in this thesis.*

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- Stafford L, Stafford A, Hughes J, Angley M, Bereznicki L, Peterson G. Drug-related problems identified in post-discharge medication reviews for patients taking warfarin. *Int J Clin Pharm* 2011;33(4):621-6.
- Stafford L, van Tienen EC, Peterson GM, Bereznicki LR, Jackson SL, Bajorek BV, Mullan JR, DeBoos IM. Warfarin management after discharge from hospital: a qualitative analysis. *J Clin Pharm Ther* (in press). Published online: 20 Oct 2011.

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## **Letters to the Editor**

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- Stafford L, Peterson L, Bereznicki L, Jeffrey E, Jackson S. Early outcomes of a pharmacist-led post-discharge warfarin management service. Conference

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- Peterson G, Stafford L, Bereznicki L, Jackson S, on behalf of “The Role of Community Pharmacy in Post Hospital Management of Patients Initiated on Warfarin” Project Team. Short-term outcomes of usual care in patients taking warfarin after discharge from hospital. Conference poster. Pharmacy Guild of Australia Research Summit. Canberra, March 2 to 4, 2010.
- Stafford L, Peterson GM, Bereznicki LRE, van Tienen EC, Jackson SL. Outcomes of a pharmacist-led post-discharge warfarin management service: adverse events, warfarin knowledge and patient satisfaction. Conference paper. Society of Hospital Pharmacists of Australia 2010 Tasmanian Branch Symposium. Port Arthur, May 21 to 23, 2010.
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- Stafford L, Peterson GM, Bereznicki LRE. Outcomes of a pharmacist-led post discharge warfarin management service: adverse events, warfarin knowledge and patient satisfaction. Conference paper. SEiR 2010 Postgraduate Research Conference. Hobart, November 16 to 17, 2010.
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